Optical Gain Spectroscopy of Solution Processable 2D Materials for Integrated Micro-Lasers

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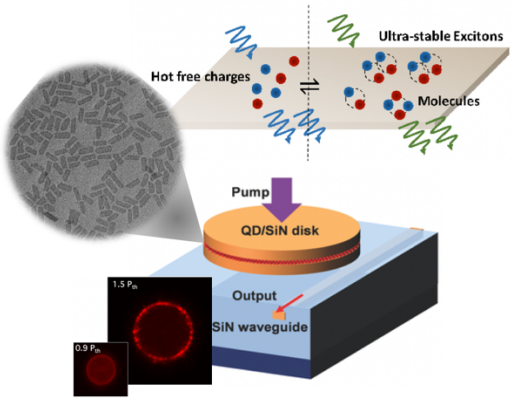
Integrated photonic circuits, increasingly based on silicon (-nitride), are at the core of the next generation of low-cost, energy efficient optical devices ranging from on-chip interconnects to biosensors. One of the main bottlenecks in developing such components is that of implementing diverse functionalities on the passive platform, such as light emission and amplification. A promising route is that of hybridization, where a new photonic material is combined with the existing framework to provide a desired functionality. Colloidal nanomaterials are perfectly suited for this purpose as they combine low cost synthesis and deposition with the ability to emit an amplify light over a broad spectral range. In this contribution, we highlight the role two-dimensional nanomaterials in this unique hybrid approach.[1,2] Through use of quantitative and combinatory ultrafast spectroscopy, we reveal the peculiar photo-physics of this new class of solution processable nanoscale materials and show their potential for realizing low cost, small footprint integrated lasers.



References:

(1) Xie, W.; Zhu, Y.; Bisschop, S.; Aubert, T.; Hens, Z.; Thourhout, D. Van; Geiregat, P. *J. Sel. Top. Quantum Electron.* **2017**, *23* (5).

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